

INDUSTRIAL EQUIPMENT MANUFACTURING

CNC Monitoring in Industrial Equipment Manufacturing: Case Study

27% higher productivity with WatchMen. A closer look at idle time, productive capacity and performance across three shifts.



Representative CNC machining photograph supplied for the case study.

125

CNC machines in the manufacturer's fleet

Turning + milling

Precision components for industrial coding and marking equipment

+27%

Reported productivity increase

An industrial coding and marking equipment manufacturer achieved **27% higher productivity after using WatchMen**, according to Novo AI's customer-confirmed project information.

-44.44%

Calculated idle-time reduction

+121,500 h

Calculated annual capacity gain

Making better use of the existing fleet

Waiting for material, tools, approvals or the next order can consume valuable machine time. Recurring short stops and delayed responses to alarms add further losses. Across a large CNC fleet, those minutes accumulate.

WatchMen makes machine activity visible over time. Production teams can use that evidence to locate recurring losses, investigate their causes and check the effect of changes to daily routines.

The detailed operational KPIs in this case study are calculations from the supplied worksheet. The reported customer result is +27% productivity. Calculation inputs and the OEE relationship are explained on page 5.

RESULTS AT A GLANCE

The complete before-and-after comparison

The headline productivity result is reported by Novo AI. The operational comparison below expresses the supplied worksheet's calculated breakdown of that gain.

Performance measure	Before	After	Change
Reported productivity	Customer baseline	27% higher	+27.00%
Calculated productive share	60.00%	76.20%	+16.20 pp
Calculated productive time / year	450,000 h	571,500 h	+121,500 h
Calculated idle time / year	135,000 h	75,000 h	-44.44%
Calculated downtime / year	60,000 h	37,500 h	-37.50%
Calculated microstop time / year	30,000 h	18,750 h	-37.50%
Calculated setup losses / year	60,000 h	37,500 h	-37.50%
Calculated other losses / year	15,000 h	9,750 h	-35.00%
Calculated nonproductive share	40.00%	23.80%	-40.50%
Calculated same-work duration ¹	20.00 h	15.75 h	-21.26%
Calculated OEE sensitivity ²	52.92%	67.21%	+14.29 pp

pp = percentage points. Percentage changes are relative to the baseline. Annual time categories form one fixed budget of 750,000 scheduled machine-hours.

+121,500 h

Productive machine time rises from **450,000 to 571,500 hours**. This is a **27% increase** within the same scheduled time budget.

Calculated additional productive capacity per year

What these improvements mean

Lower idle time makes more of the existing schedule available for production. Fewer interruptions and shorter setup-related losses improve continuity. Together, these changes provide a concrete way to understand where additional capacity could come from.

¹ Same work at a sustained 27% higher effective output rate: $20 \div 1.27 = 15.75$ hours. This concerns elapsed operation time, not faster cutting speed.

² OEE sensitivity uses the worksheet's fixed performance and quality inputs. See page 5 for the formula and definitions.

IDLE TIME & SHIFT PERFORMANCE • CALCULATED BREAKDOWN

Less waiting in every shift. More productive minutes.

–38.4 min

Idle time per machine
per eight-hour shift

Idle time falls from **86.4 to 48.0 minutes**. Across 125 machines and three shifts, that equals **240 fewer idle hours per production day**.

Idle-time measure	Before	After	Time released
Per machine per 8-hour shift	86.4 min	48.0 min	38.4 min
Fleet per production day	540 h	300 h	240 h
Fleet over 20 production days	10,800 h	6,000 h	4,800 h
Fleet per year	135,000 h	75,000 h	60,000 h

Idle-time reduction contributes **49.38% of the calculated capacity gain**. Readiness for the next job is therefore a major improvement priority.

Changes across all three shifts

The worksheet applies a 27% relative improvement to each shift, with different productive-time starting points.

Measure per machine	Shift 1	Shift 2	Shift 3
Productive share before	62.00%	60.00%	58.00%
Productive share after	78.74%	76.20%	73.66%
Productive hours before → after	4.96 → 6.30 h	4.80 → 6.10 h	4.64 → 5.89 h
Extra productive minutes / shift	80.4 min	77.8 min	75.2 min
Relative productivity gain	+27.00%	+27.00%	+27.00%

Approximately 75–80 additional productive minutes per machine in each shift. Across the three shifts, the calculated average gain is **3.888 productive hours per machine per day**.

Shift comparisons use equal eight-hour schedules and machine coverage. Product mix, necessary handling, setup and quality requirements should be comparable. The fleet idle-time figures above do not allocate idle losses to individual shifts.

IMPROVEMENT PRIORITIES

From visible losses to practical production gains



Novo AI retrofit sensor.
Representative product photograph.

Machine states show when losses occur. Production context helps explain why.

The priorities below link monitoring information to changes in preparation, response and coordination. Their annual capacity contributions come from the same calculation used in the results table.

01 Prepare the next job earlier

Check material, tools, program readiness and release status before the current job ends. Give idle alerts a named response owner.

Calculated link: 60,000 h/year from lower idle time

02 Reduce recurring microstops

Review repeated events by machine, product and tool. Use maintenance checks and material-readiness reviews to address the cause.

Calculated link: 48 → 30 events per machine per shift; 11,250 h/year released

03 Improve setup and handover readiness

Prepare fixtures and programs in advance. Separate required setup work from avoidable waiting and standardize handovers.

Calculated link: 38.4 → 24.0 setup-related min/shift; 22,500 h/year released

04 Give repeated alarms clear ownership

Define who responds, when to escalate and how recurring problems are documented and reviewed.

Calculated link: 37.50% less downtime; 22,500 h/year released

05 Use machine reality to improve planning

Compare productive processing time with elapsed time and order targets. Distinguish unrealistic standards from execution losses.

Calculated link: Same-work duration: 20.00 → 15.75 h

A REPEATABLE IMPROVEMENT CYCLE

1 Measure

Record machine states and losses.

2 Investigate

Review causes with production context.

3 Act

Improve the relevant production routine.

4 Verify

Compare the same metrics and conditions.

OEE & CALCULATION BASIS

OEE and productive capacity

+14.29 pp

Calculated OEE sensitivity

The worksheet calculation changes OEE from **52.92%** to **67.21%**, while keeping the performance factor at **90%** and quality at **98%**.

How the OEE values are calculated

Calculation component	Before	After
Availability input ¹	60.00%	76.20%
Performance factor	90.00%	90.00%
Quality factor	98.00%	98.00%
OEE = availability × performance × quality	52.92%	67.21%

¹ For this sensitivity calculation, the worksheet sets availability equal to productive-time share. This is a modeling choice, not a general equivalence between utilization and OEE. The resulting OEE values are calculated outputs, not the reported customer productivity KPI.

Where the additional capacity comes from

Reduced loss category	Hours released / year	Share of total
Idle time	60,000 h	49.38%
Microstops	11,250 h	9.26%
Setup-related losses	22,500 h	18.52%
Unexpected downtime	22,500 h	18.52%
Other losses	5,250 h	4.32%
Total additional productive capacity	121,500 h	100.00%

The calculation inputs

125 machines × 3 shifts × 8 hours × 250 production days = 750,000 scheduled machine-hours per year. The worksheet selects a 60% productive baseline. Applying the reported 27% relative gain gives 76.2%, or 571,500 productive hours versus 450,000.

The calculation covers all 125 machines at equal scheduled hours, with unchanged processing rate and quality. Released time becomes productive. The loss allocations and shift starting values are worksheet model inputs. Recovered hours and reduced losses describe the same gain and must not be added together.

Discuss your CNC capacity: contact@novoai.de · novoai.de